WHAT IS CLAIMED IS:

1. A micropipette for ejecting a predetermined amount of a sample stored in a cavity from a sample ejection port by changing the volume of the cavity with the aid of the activation of a piezoelectric/electrostrictive element mounted on an outer surface of a portion opposite to a portion, wherein the cavity is formed, of a pipette main body, wherein a sample inlet port for supplying the sample from the outside of the pipette main body, the cavity for receiving and temporarily storing the supplied sample and the sample ejection port for ejecting the stored sample to the outside via a through hole in a nozzle portion are disposed in the pipette main body,

wherein a shape of a cross section perpendicular to the direction of an axis of the through hole in the nozzle portion has more than three projections radially protruded from the center of the through hole, thus exhibiting either a polygon having acute and obtuse interior angles or a crown shape formed by connecting the projections to each other, and the cross section area of the through hole gradually decreases from the sample supplying opening end to the sample discharging opening end, preserving a similar shape.

2. A micropipette for ejecting a predetermined amount

of a sample stored in a cavity from a sample ejection port by changing the volume of the cavity with the aid of the activation of a piezoelectric/electrostrictive element mounted on an outer surface of a portion opposite to a portion, wherein the cavity is formed, of a pipette main body, wherein a sample inlet port for supplying the sample from the outside of the pipette main body, the cavity for receiving and temporarily storing the supplied sample and the sample ejection port for ejecting the stored sample to the outside via a through hole in a nozzle portion are disposed in the pipette main body,

wherein a shape of a cross section perpendicular to the direction of an axis of the through hole in the nozzle portion is approximately circular from the sample supplying opening end towards the sample discharging opening end to a first position located at a predetermined length therefrom, and the shape of a cross section perpendicular to the direction of an axis of the through hole has more than three projections radially protruded from the center of the through hole, thereby exhibiting either a polygon having acute and obtuse interior angles or a crown shape formed by connecting the projections to each other at an end of the sample discharging opening, and the cross section area of the through hole gradually decreases from the sample supplying opening, while retaining almost around shape until

a first point, to the sample discharging opening end.

3. A micropipette according to claim 1, wherein the angle between straight lines determined by connecting the apexes of the adjacent projections to the center either in the polygon or in the crown shape having said projections is 1 degree to 120 degrees.

4. A micropipette according to claim 1, wherein the total length of the circumference of the polygon or the crown shape is more than 1.1 times larger than the length of the circumference of a circle having the same area as the cross section of the polygon or the crown shape.

5. A micropipette according to claim 1, wherein the rate of continuous decreasing in the cross section area of the through hole in the nozzle portion from the sample supplying opening end to a second position located at a predetermined length therefrom towards the sample discharging opening end is greater than that from the second position to the sample discharging opening end end.

6. A micropipette according to claim 1, wherein the surface roughness of the inner surfaces of the through hole in the nozzle portion is greater than that of the major

surface in which the sample supplying opening of the through hole is formed.

7. A micropipette according to claim 1, wherein the surface in the vicinity of the sample discharging opening end of the through hole in the nozzle portion is treated by a liquid repellent.

8. A micropipette according to claim 1, wherein at least at the portion where the cavity is disposed and at least at the portion where the piezoelectric/electrostrictive element is disposed the pipette is made of zirconia ceramics.

9. A micropipette according to claims 8, wherein said zirconia ceramics is produced by laminating and sintering green sheets.

10. A micropipette according to claim 1, wherein said pipette main body is made of resin at the portion where the sample ejection port is formed.

11. A micropipette according to claim 1, wherein said piezoelectric/electrostrictive element is formed by piezoelectric/electrostrictive layers containing at least

one lead compound in a group of lead zirconate, lead titanate and lead magnesium niobite as a main component.

12. A micropipette according to claim 1, wherein said pipette main body is provided with a plurality of sample inlet ports, a plurality of cavities and a plurality of sample ejection ports.

13. A micropipette according to claim 1, wherein said pipette main body is constituted by a plurality of first pipette elements and a second pipette element, wherein said cavity and said piezoelectric/electrostrictive element are disposed in the first pipette elements, and a plurality of said sample inlet ports and a plurality of said sample ejection ports are disposed in the second pipette element, and a plurality of said first pipette elements and said second pipette element are bonded to each other.

14. A micropipette according to claim 1, wherein said pipette main body is formed by a flat plate product, and the sample ejection ports are disposed on the side surface or the main surface of the pipette main body.

15. A micropipette according to claim 1, wherein said pipette main body is formed by a flat plate product, and

said sample ejection ports are disposed on one main surface of the pipette main body whereas said sample inlet port is disposed on the other main surface.

16. A micropipette according to claim 1, wherein a plurality of said sample inlet ports are connected to said one cavity.

17. A micropipette composite unit, wherein said unit is formed by fixing a plurality of micropipettes selected from the group consisting of:

a micropipette for ejecting a predetermined amount of a sample stored in a cavity from a sample ejection port by changing the volume of the cavity with the aid of the activation of a piezoelectric/electrostrictive element mounted on an outer surface of a portion opposite to a portion, wherein the cavity is formed, of a pipette main body, wherein a sample inlet port for supplying the sample from the outside of the pipette main body, the cavity for receiving and temporarily storing the supplied sample and the sample ejection port for ejecting the stored sample to the outside via a through hole in a nozzle portion are disposed in the pipette main body,

wherein a shape of a cross section perpendicular to the direction of an axis of the through hole in the nozzle

portion has more than three projections radially protruded from the center of the through hole, thus exhibiting either a polygon having acute and obtuse interior angles or a crown shape formed by connecting the projections to each other, and the cross section area of the through hole gradually decreases from the sample supplying opening end to the sample discharging opening end, preserving a similar shape; and

a micropipette for ejecting a predetermined amount of a sample stored in a cavity from a sample ejection port by changing the volume of the cavity with the aid of the activation of a piezoelectric/electrostrictive element mounted on an outer surface of a portion opposite to a portion, wherein the cavity is formed, of a pipette main body, wherein a sample inlet port for supplying the sample from the outside of the pipette main body, the cavity for receiving and temporarily storing the supplied sample and the sample ejection port for ejecting the stored sample to the outside via a through hole in a nozzle portion are disposed in the pipette main body,

wherein a shape of a cross section perpendicular to the direction of an axis of the through hole in the nozzle portion is approximately circular from the sample supplying opening end towards the sample discharging opening end to a first position located at a predetermined length therefrom,

and the shape of a cross section perpendicular to the direction of an axis of the through hole has more than three projections radially protruded from the center of the through hole, thereby exhibiting either a polygon having acute and obtuse interior angles or a crown shape formed by connecting the projections to each other at an end of the sample discharging opening, and the cross section area of the through hole gradually decreases from the sample supplying opening end, while retaining almost around shape until a first point, to the sample discharging opening end.

18. A dispenser, wherein said device includes either a plurality of micropipettes selected from the group consisting of:

a micropipette for ejecting a predetermined amount of a sample stored in a cavity from a sample ejection port by changing the volume of the cavity with the aid of the activation of a piezoelectric/electrostrictive element mounted on an outer surface of a portion opposite to a portion, wherein the cavity is formed, of a pipette main body, wherein a sample inlet port for supplying the sample from the outside of the pipette main body, the cavity for receiving and temporarily storing the supplied sample and the sample ejection port for ejecting the stored sample to the outside via a through hole in a nozzle portion are

disposed in the pipette main body,

wherein a shape of a cross section perpendicular to the direction of an axis of the through hole in the nozzle portion has more than three projections radially protruded from the center of the through hole, thus exhibiting either a polygon having acute and obtuse interior angles or a crown shape formed by connecting the projections to each other, and the cross section area of the through hole gradually decreases from the sample supplying opening end to the sample discharging opening end, preserving a similar shape; and

a micropipette for ejecting a predetermined amount of a sample stored in a cavity from a sample ejection port by changing the volume of the cavity with the aid of the activation of a piezoelectric/electrostrictive element mounted on an outer surface of a portion opposite to a portion, wherein the cavity is formed, of a pipette main body, wherein a sample inlet port for supplying the sample from the outside of the pipette main body, the cavity for receiving and temporarily storing the supplied sample and the sample ejection port for ejecting the stored sample to the outside via a through hole in a nozzle portion are disposed in the pipette main body,

wherein a shape of a cross section perpendicular to the direction of an axis of the through hole in the nozzle

portion is approximately circular from the sample supplying opening end towards the sample discharging opening end to a first position located at a predetermined length therefrom, and the shape of a cross section perpendicular to the direction of an axis of the through hole has more than three projections radially protruded from the center of the through hole, thereby exhibiting either a polygon having acute and obtuse interior angles or a crown shape formed by connecting the projections to each other at an end of the sample discharging opening, and the cross section area of the through hole gradually decreases from the sample supplying opening end, while retaining almost around shape until a first point, to the sample discharging opening end, and,

more than one of micropipette composite unit formed by fixing said plurality of micropippetes,

wherein sample ejection ports in said pipette main body are disposed in the form of matrix, and liquid samples of different kinds are ejected from the sample ejection ports.

19. A dispenser according to claim 18, wherein a first cartridge in which liquid samples of different kinds are stored is disposed to face said sample inlet ports.

20. A dispenser according to claim 18, wherein a

second cartridge in which an aqueous solvent or organic solvent is stored is disposed to face said sample inlet ports, and connecting spaces formed from the sample inlet ports to the sample ejection ports of said pipette main body can be cleaned with an aqueous solvent or organic solvent.

21. A dispenser according to one of claims 18, wherein a thin plate for rejecting droplets flying in a deviated direction is disposed to face the sample ejection ports in said pipette main body, said thin plate having openings whose centers are coaxially aligned in the direction of the center axes of the sample ejection ports.

22. A method for producing a biochip, in which said biochip is produced by using one member selected from the group consisting of:

a micropipette for ejecting a predetermined amount of a sample stored in a cavity from a sample ejection port by changing the volume of the cavity with the aid of the activation of a piezoelectric/electrostrictive element mounted on an outer surface of a portion opposite to a portion, wherein the cavity is formed, of a pipette main body, wherein a sample inlet port for supplying the sample from the outside of the pipette main body, the cavity for receiving and temporarily storing the supplied sample and

the sample ejection port for ejecting the stored sample to the outside via a through hole in a nozzle portion are disposed in the pipette main body,

wherein a shape of a cross section perpendicular to the direction of an axis of the through hole in the nozzle portion has more than three projections radially protruded from the center of the through hole, thus exhibiting either a polygon having acute and obtuse interior angles or a crown shape formed by connecting the projections to each other, and the cross section area of the through hole gradually decreases from the sample supplying opening end to the sample discharging opening end, preserving a similar shape;

a micropipette for ejecting a predetermined amount of a sample stored in a cavity from a sample ejection port by changing the volume of the cavity with the aid of the activation of a piezoelectric/electrostrictive element mounted on an outer surface of a portion opposite to a portion, wherein the cavity is formed, of a pipette main body, wherein a sample inlet port for supplying the sample from the outside of the pipette main body, the cavity for receiving and temporarily storing the supplied sample and the sample ejection port for ejecting the stored sample to the outside via a through hole in a nozzle portion are disposed in the pipette main body,

wherein a shape of a cross section perpendicular to the

direction of an axis of the through hole in the nozzle portion is approximately circular from the sample supplying opening end towards the sample discharging opening end to a first position located at a predetermined length therefrom, and the shape of a cross section perpendicular to the direction of an axis of the through hole has more than three projections radially protruded from the center of the through hole, thereby exhibiting either a polygon having acute and obtuse interior angles or a crown shape formed by connecting the projections to each other at an end of the sample discharging opening, and the cross section area of the through hole gradually decreases from the sample supplying opening end, while retaining almost around shape until a first point, to the sample discharging opening end;

a micropipette composite unit formed fixing a plurality of said micropipette; and

a dispenser including at least one member selected from the group consisting of a plurality of said micropipettes, and a plurality of micropipette composite formed from said micropipette.